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Application No.: 10/664,671

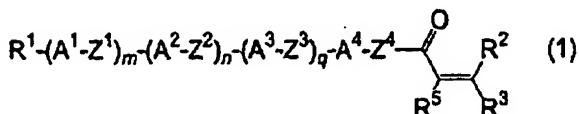
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AMENDMENTS

In the Claims:

Please amend the claims as follows:

1. (currently amended) A compound of formula (1):



wherein R¹ represents hydrogen, halogen, -CN, -CF₃, -CF₂H, -CFH₂, -OCF₃, -OCF₂H, -N=C=O, -N=C=S, or alkyl having from 1 to 20 carbon atoms, and any -CH₂- of the alkyl may be substituted with -O-, -S-, -CO-, -COO-, -OCO-, -CH=CH-, -CF=CF- or -C≡C-, and any hydrogen thereof may be substituted with halogen or -CN; R², R³ and R⁵ each independently represent hydrogen or alkyl having from 1 to 3 carbon atoms; A¹, A², A³ and A⁴ each independently represent 1,4-cyclohexylene, 1,4-cyclohexenylene, 1,4-phenylene, naphthalene-2,6-diyl, tetrahydronaphthalene-2,6-diyl, fluorene-2,7-diyl, bicyclo[2.2.2]octane-1,4-diyl or bicyclo[3.1.0]hexane-3,6-diyl, and in these rings, any -CH₂- may be substituted with -O-, and any -CH= may be substituted with -N=, and in these rings, any hydrogen may be substituted with halogen or alkyl having from 1 to 5 carbon atoms; Z¹, Z² and Z³ each independently represent a single bond, -(CH₂)_a-, -O(CH₂)_a-, -(CH₂)_aO-, -O(CH₂)_aO-, -CH=CH-, -C≡C-, -COO-, -OCO-, -(CF₂)₂-, -C≡C-COO-, -OCO-C≡C-, -CH=CH-(CH₂)₂-, -(CH₂)₂-CH=CH-, -CF=CF-,

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-C≡C-HC=CH-, -CH=CH-C≡C-, -OCF₂-, or -CF₂O-, and a indicates an integer of from 1 to 20; Z⁴ represents a single bond or α,ω -alkylene having from 1 to 4 carbon atoms, and any -CH₂- of the alkylene may be substituted with -O-, -S-, -COO- or -OCO-; m, n and q each independently indicates 0, 1 or 2, but m+n+q≥1; and wherein when m+n+q=1, any -CH₂- of the alkyl represented by R¹ is not substituted with -CO- and Z⁴ is a single bond; and wherein when m+n+q=1, Z⁴ is a single bond and A⁴ represents 1,4-phenylene, Z¹, Z² and Z³ each is not a single bond.

2. (original) A compound as claimed in claim 1, in which R⁵ in formula (1) is hydrogen.

3. (original) A compound as claimed in claim 2, in which R² and R³ in formula (1) in claim 1 are hydrogen.

4. (original) A compound as claimed in claim 3, in which A¹, A², A³ and A⁴ in formula (1) in claim 1 are independently any of 1,4-cyclohexylene or 1,4-phenylene, and any hydrogen in these rings may be substituted with halogen.

5. (original) A compound as claimed in claim 3, in which A¹, A², A³ and A⁴ in formula (1) in claim 1 are independently any of 1,4-cyclohexylene or 1,4-phenylene, and any hydrogen in

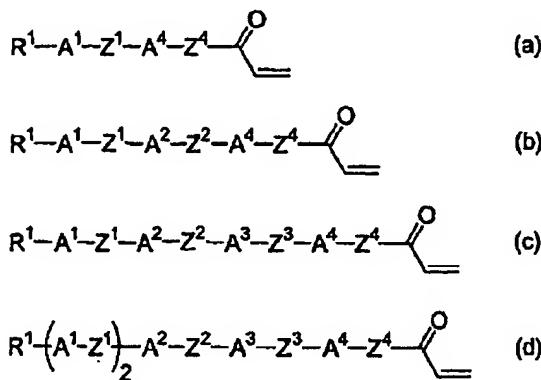
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these rings may be substituted with halogen; and Z^1 , Z^2 and Z^3 are independently any of a single bond, $-(CH_2)_a-$, $-O(CH_2)_a-$, $-(CH_2)_aO-$, $-O(CH_2)_aO-$, $-CH=CH-$, $-C\equiv C-$, $-COO-$, $-OCO-$, $-OCF_2-$, or $-CF_2O-$.

6. (original) A compound as claimed in claim 5, in which Z^4 in formula (1) in claim 1 is a single bond.

7. (currently amended) Any one compound of formulae (a) to (d):



wherein R^1 represents hydrogen, halogen, $-CN$, $-CF_3$, $-CF_2H$, $-CFH_2$, $-OCF_3$, $-OCF_2H$, $-N=C=O$, $-N=C=S$, or alkyl having from 1 to 20 carbon atoms, and any $-CH_2-$ of the alkyl may be substituted with $-O-$, $-S-$, $-CO-$, $-COO-$, $-OCO-$, $-CH=CH-$, $-CF=CF-$ or $-C\equiv C-$, and any hydrogen thereof may be substituted with halogen or $-CN$; A^1 , A^2 , A^3 and A^4 each independently represent 1,4-cyclohexylene, 1,4-cyclohexenylene, 1,4-phenylene, naphthalene-2,6-diyl, tetrahydronaphthalene-2,6-diyl, fluorene-2,7-diyl, bicyclo[2.2.2]octane-1,4-diyl or bicyclo[3.1.0]hexane-3,6-diyl, and in these rings, any

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-CH₂- may be substituted with -O-, and any -CH= may be substituted with -N=, and in these rings, any hydrogen may be substituted with halogen or alkyl having from 1 to 5 carbon atoms; Z¹, Z² and Z³ each independently represent a single bond, -(CH₂)_a-, -O(CH₂)_a-, -(CH₂)_aO-, -O(CH₂)_aO-, -CH=CH-, -C≡C-, -COO-, -OCO-, -(CF₂)₂-, -C≡C-COO-, -OCO-C≡C-, -CH=CH-(CH₂)₂-, -(CH₂)₂-CH=CH-, -CF=CF-, -C≡C-HC=CH-, -CH=CH-C≡C-, -OCF₂- or -CF₂O-, and a indicates an integer of from 1 to 20; Z⁴ represents a single bond or α,ω -alkylene having from 1 to 4 carbon atoms, and any -CH₂- of the alkylene may be substituted with -O-, -S-, -COO- or -OCO-, and

wherein in formula (a),

any -CH₂- of the alkyl represented by R¹ is not substituted with -CO-; and

Z⁴ is a single bond; and

Z¹ is not a single bond when A⁴ represents 1,4-phenylene.

8. (original) A compound as claimed in claim 7, in which R¹ in formulae (a) to (d) is hydrogen, halogen, -CN, -CF₃, -CF₂H, -CFH₂, -OCF₃, -OCF₂H, alkyl having from 1 to 10 carbon atoms, alkoxy having from 1 to 10 carbon atoms, alkoxyalkyl having from 2 to 10 carbon atoms, or alkenyl having from 2 to 10 carbon atoms; A¹, A², A³ and A⁴ are independently any of 1,4-cyclohexylene or 1,4-phenylene, and in these rings, any hydrogen may be substituted with halogen; Z¹, Z² and Z³ are independently any of a single bond, -(CH₂)₂-, -(CH₂)₄-, -OCH₂-, -O(CH₂)₃-, -CH₂O-, -(CH₂)₃O-,

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-O(CH₂)₂O-, -CH=CH-, -C≡C-, -COO-, -OCO-, -(CF₂)₂-, -CF=CF-, -OCF₂- or
-CF₂O-; Z⁴ is a single bond.

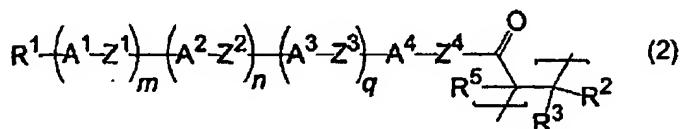
9. (previously presented) A liquid-crystal composition containing at least two polymerizable compounds, in which at least one polymerizable compound is the compound of claim 1.

10. (currently amended) A liquid-crystal composition ~~as claimed in claim 9, which contains~~ at least two polymerizable compounds in which all the polymerizable compounds are the compounds of claim 1.

11. (currently amended) A liquid-crystal composition ~~as claimed in claim 9, which contains~~ at least two polymerizable compounds that comprise at least one compound of claim 1 and at least one polymerizable compound except the compound.

12. (original) A liquid-crystal composition as claimed in claim 9, which additionally contains an optically-active compound.

13. (allowed) A polymer having a constitutional unit of formula (2):



wherein R¹ represents hydrogen, halogen, -CN, -CF₃, -CF₂H, -CFH₂, -OCF₃, -OCF₂H,

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—N=C=O, —N=C=S, or alkyl having from 1 to 20 carbon atoms, and any —CH₂— of the alkyl may be substituted with —O—, —S—, —CO—, —COO—, —OCO—, —CH=CH—, —CF=CF— or —C≡C—, and any hydrogen thereof may be substituted with halogen or —CN; R², R³ and R⁵ each independently represent hydrogen or an alkyl having from 1 to 3 carbon atoms; A¹, A², A³ and A⁴ each independently represent 1,4-cyclohexylene, 1,4-cyclohexenylene, 1,4-phenylene, naphthalene-2,6-diyl, tetrahydronaphthalene-2,6-diyl, fluorene-2,7-diyl, bicyclo[2.2.2]octane-1,4-diyl or bicyclo[3.1.0]hexane-3,6-diyl, and in these rings, any

—CH₂— may be substituted with —O—, and any —CH=— may be substituted with —N=—, and in these rings, any hydrogen may be substituted with halogen or alkyl having from 1 to 5 carbon atoms; Z¹, Z² and Z³ each independently represent a single bond, —(CH₂)_a—,

—O(CH₂)_aO—, —(CH₂)_aO—, —O(CH₂)_aO—, —CH=CH—, —C≡C—, —COO—, —OCO—, —(CF₂)₂—,

—C≡C—COO—, —OCO—C≡C—, —CH=CH—(CH₂)₂—, —(CH₂)₂—CH=CH—, —CF=CF—,

—C≡C—HC=CH—, —CH=CH—C≡C—, —OCF₂—, or —CF₂O—, and a indicates an integer of from 1 to 20; Z⁴ represents a single bond or α,ω -alkylene having from 1 to 4 carbon atoms, and any —CH₂— of the alkylene may be substituted with —O—, —S—, —COO— or

—OCO—; and m, n and q each independently indicate 0, 1 or 2; and

wherein when m+n+q=1, any —CH₂— of the alkyl represented by R¹ is not substituted with —CO— and Z⁴ is a single bond.

14. (allowed) A polymer as claimed in claim 13, in which R⁵ in formula (2) is hydrogen.

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15. (currently amended) A polymer as claimed in claim ~~14~~ 13, in which R², R³ and R⁵ in formula (2) in claim ~~13~~ are hydrogen.

16. (currently amended) A polymer as claimed in claim ~~15~~ 13, in which R², R³ and R⁵ are hydrogen; A¹, A², A³ and A⁴ in formula (2) in claim ~~13~~ are independently any of 1,4-cyclohexylene or 1,4-phenylene, and any hydrogen in these rings may be substituted with halogen.

17. (currently amended) A polymer as claimed in claim ~~15~~ 13, in which R², R³ and R⁵ are hydrogen; A¹, A², A³ and A⁴ in formula (2) in claim ~~13~~ are independently any of 1,4-cyclohexylene or 1,4-phenylene, and any hydrogen in these rings may be substituted with halogen; and Z¹, Z² and Z³ are independently any of a single bond, $-(CH_2)_a-$, $-O(CH_2)_a-$, $-(CH_2)_aO-$, $-O(CH_2)_aO-$, $-CH=CH-$, $-C=C-$, $-COO-$, $-OCO-$, $-OCF_2-$, or $-CF_2O-$.

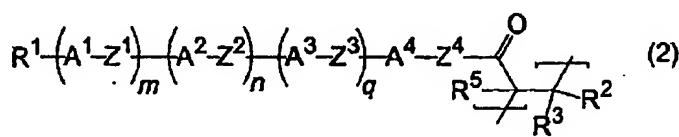
18. (currently amended) A polymer as claimed in claim ~~17~~ 13, in which R², R³ and R⁵ are hydrogen; A¹, A², A³ and A⁴ are independently any of 1,4-cyclohexylene or 1,4-phenylene, and any hydrogen in these rings may be substituted with halogen; Z¹, Z² and Z³ are independently any of a single bond, $-(CH_2)_a-$, $-O(CH_2)_a-$, $-(CH_2)_aO-$, $-O(CH_2)_aO-$, $-CH=CH-$, $-C=C-$, $-COO-$, $-OCO-$, $-OCF_2-$, or $-CF_2O-$, and Z⁴ in formula (2) in claim ~~13~~ is a single bond.

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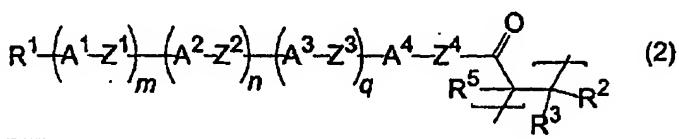
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19. (allowed) A polymer as claimed in claim 13, in which R¹ in formula (2) is hydrogen, halogen, -CN, -CF₃, -CF₂H, -CFH₂, -OCF₃, -OCF₂H, alkyl having from 1 to 10 carbon atoms, alkoxy having from 1 to 10 carbon atoms, alkoxyalkyl having from 2 to 10 carbon atoms, or alkenyl having from 2 to 10 carbon atoms; R², R³ and R⁵ are hydrogen; A¹, A², A³ and A⁴ are independently any of 1,4-cyclohexylene or 1,4-phenylene, and in these rings, any hydrogen may be substituted with halogen; Z¹, Z² and Z³ are independently any of a single bond, -(CH₂)₂-, -(CH₂)₄-, -OCH₂-, -O(CH₂)₃-, -CH₂O-, -(CH₂)₃O-, -O(CH₂)₂O-, -CH=CH-, -C≡C-, -COO-, -OCO-, -(CF₂)₂-, -CF=CF-, -OCF₂- or -CF₂O-; Z⁴ is a single bond.

20. (currently amended) A polymer ~~as claimed in claim 13, which that~~ is obtained through homopolymerization of one compound of claim 1 and has a constitutional unit of formula (2):



21. (currently amended) A polymer ~~as claimed in claim 13, which that~~ is obtained from the liquid-crystal composition of claim 9 and has a constitutional unit of formula (2):



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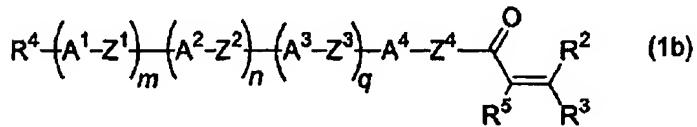
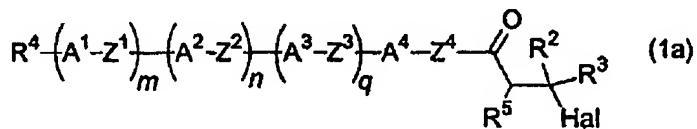
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22. (previously presented) An optically-anisotropic material of the polymer of claim 13.

23. (previously presented) A liquid-crystal display device, which contains the polymer of claim 13.

24. (original) A liquid-crystal display device, which contains the optically-anisotropic material of claim 22.

25. (allowed) A method for producing a vinyl ketone compound of formula (1b), which comprises reacting one molar equivalent of a compound of formula (1a) with from 1 to 10 molar equivalents of a Lewis acid at -70°C to 200°C, followed by dehydrohalogenating the resulting compound:



wherein R⁴ represents hydrogen, halogen, -OH, -CN, -CF₃, -CF₂H, -CFH₂, -OCF₃, -OCF₂H, -N=C=O, -N=C=S, or alkyl having from 1 to 20 carbon atoms, and any -CH₂- of the alkyl may be substituted with -O-, -S-, -CO-, -COO-, -OCO-, -CH=CH-, -CF=CF- or -C≡C-, and any hydrogen thereof may be substituted with halogen or -CN; R², R³

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and R⁵ each independently represent hydrogen or an alkyl having from 1 to 3 carbon atoms; A¹, A², A³ and A⁴ each independently represent 1,4-cyclohexylene, 1,4-cyclohexenylene, 1,4-phenylene, naphthalene-2,6-diyl, tetrahydronaphthalene-2,6-diyl, fluorene-2,7-diyl, bicyclo[2.2.2]octane-1,4-diyl or bicyclo[3.1.0]hexane-3,6-diyl, and in these rings, any -CH₂- may be substituted with -O-, and any -CH= may be substituted with -N=, and in these rings, any hydrogen may be substituted with halogen or alkyl having from 1 to 5 carbon atoms; Z¹, Z² and Z³ each independently represent a single bond, -(CH₂)_a-, -O(CH₂)_a-, -(CH₂)_aO-, -O(CH₂)_aO-, -CH=CH-, -C≡C-, -COO-, -OCO-, -(CF₂)₂-, -C≡C-COO-, -OCO-C≡C-, -CH=CH-(CH₂)₂-, -(CH₂)₂-CH=CH-, -CF=CF-, -C≡C-HC=CH-, -CH=CH-C≡C-, -OCF₂- or -CF₂O-, and a indicates an integer of from 1 to 20; Z⁴ represents a single bond or α,ω -alkylene having from 1 to 4 carbon atoms, and any -CH₂- of the alkylene may be substituted with -O-, -S-, -COO- or -OCO-; m, n and q each independently indicate 0, 1 or 2; Hal represents chlorine, bromine or iodine.